ROYAL ASTRONOMICAL SOCIETY.

VOL. II. *February* 10, 1832. No. 10.

Report of the Council of the Society to the Twelfth Annual General Meeting, held this day.

IN compliance with the Bye-laws, the Council now report to the Members at large, the progress and state of the Society, at this their Twelfth Anniversary. During the past year, an important alteration in the condition of our body, alluded to in the last Report, has taken place: a Royal Charter has been obtained; and, conformably thereto, an altered and amended set of Bye-laws has been agreed to by the Society, differing however but little from those which were before in existence; the principal alterations being such as were required by this new state of things.

Amongst the subjects which necessarily engaged the attention of the Council, has been the formation of a Common Seal for executing legal documents; and the arrangement of a design and form of a Diploma, for our Associates. In the execution of this latter object, the Council have much pleasure in noticing the kind and liberal services of Mr. William Barnard Clarke, Architect, who has furnished the Society with the engraving of the head of Newton, which embellishes that public document.

The Council congratulate the Society on the favourable condition of their finances; as will appear from the following statement of their accounts for the past year, viz.

Receipts.	£.	*s.*	*d.*
Balance of last year.....	543	13	8
2 years' Dividends on £800 Consols	48	0	0
½ year's ditto on £857 13*s.* 8*d.* 4 per cents.....	17	3	0
1 year's ditto on ditto, now new 3½ per cents	30	0	4
½ year's ditto on £1065 19*s.* ditto	18	13	0
On account of Arrears ...	90	6	0
71 annual contributions, 1831–2	149	2	0
8 compositions.....	168	0	0
13 admission fees and 11 first year's contributions	49	7	0
Sale of memoirs	33	6	0
	£1147	11	0

Expenditure.	£.	*s.*	*d.*
3 gold medals	32	15	6
Priestley and Co., balance of account for printing, &c., Vol. IV. Part 1...	131	14	2
Ditto, Vol. IV. Part 2....	323	18	0
Engraving plate of Saturn, and plate for diploma	12	0	0
Purchase of £208 5*s.* 4*d.* 3½ per cent stock	189	0	0
1 year's rent of apartments to Michaelmas	52	10	0
Lights, attendance, &c., at apartments	14	7	4
1 year's salary to the assistant Secretary	100	0	0
Collector's commission on £490 1*s.* and stationery	26	16	10
Iron chest £13, and large official seal £30 10*s.*...	43	10	0
Sundry disbursements for stationery, bookbinding, &c. &c.	9	10	6
Balance in Treasurer's hands, Feb. 1832.....	211	8	8
	£1147	11	0

Assets of the Society.

		£.	s.	d.
Balance in the hands of the Treasurer		201	8	8
Arrears, Feb. 1832:—				
2 contributions of five years' standing	£21 0 0			
5 ——— of four ditto, and 1 admission fee	44 2 0			
4 ——— of three ditto	25 4 0			
7 ——— of two ditto, and 1 admission fee	31 10 0			
11 ——— for the year just expired	23 2 0	170	2	0
1 ——— non-resident	8 8 0			
1 contribution at 4 guineas, 4 ——— at 3 ditto, for New Fellows	4 4 0 12 12 0			
Some other amounts, doubtful.				
£1865 19*s.* stock, valued at		1690	0	0
Due by Messrs. Priestley and Weale for Memoirs sold		56	4	6
Unsold Memoirs.				
Various astronomical instruments, books, prints, &c.				
1 gold medal unappropriated.				
15 silver ditto.				

Abstract of the present state of the Society, as regards its Fellows:—

	Compounded.	Annual Contributors.	Non-resident.	Honorary and Patron.	Total Members	Associates.	Grand Total.
Feb. 1831 ...	45	101	110	2	258	41	299
Since elected	8	10	...	...	18	3	21
Since lost ...	...	1	4	...	5	2	7
Feb. 1832 ...	53	110	106	2	271	42	313

The instruments belonging to the Society are now in the possession of the following gentlemen:

Beaufoy Circle and Clock,	Rev. M. Ward.
Wollaston Telescope and Micrometer,	Mr. Maclear.
Lee Circle,	Capt. Smyth.
Transit and Clock, returned by Capt. Smyth,	Mr. T. Jones (for safe custody).
Two pendulums lent to Capt. Foster,	Mr. Baily.

The Council refer the Society with pleasure to the numerous observations of occultations and eclipses of Jupiter's satellites, communicated by Mr. Maclear, and read in December last.

A well-arranged and accurate catalogue of the Library has been formed by Mr. Epps, the Assistant-Secretary, and the books are now being compared with this catalogue by a Committee appointed for the purpose, which has nearly finished its labours.

Amongst the deaths which have occurred in the preceding year, the Council regret the loss of two very valuable members of the Society, as well as two of its Associates: viz. the Rev. Fearon

Fallows, late astronomer at the Cape of Good Hope, Capt. Foster of the Royal Navy, M. Pons of Marlia, and the Abbé Grégoire.

Mr. Fallows is an example, and, in this country, happily, not a solitary example, of the influence which talents and character may have on the fortunes of an individual, under circumstances apparently the most untoward. He was born, July 4, 1789, at Cockermouth, in the county of Cumberland, and his early years were spent in following his father's occupation, that of a weaver, with no further time or opportunity for education than could be afforded by the ordinary intervals of labour. Fortunately, his father was himself a man of considerable information and studious habits, and devoted these leisure moments to the education of his child, who thus became early acquainted with the principles of arithmetic and geometry, subjects in which he chiefly delighted. When a mere boy, a mathematical book was his constant companion at the loom; and this taste was encouraged by the kindness of many persons in the vicinity, who supplied him with books, and such assistance in his studies as they were competent to give. His father having become parish clerk at the neighbouring church of Bridekirk, the extraordinary acquirements of the young mathematician became known to the Rev. Mr. Hervey, vicar of that parish; and by the advice and recommendation of this gentleman, Mr. Fallows was engaged as an assistant by Mr. Temple, at that time head-master of Plumbland school. On the death of Mr. Temple in 1808, Mr. Hervey further exerted himself to obtain for Mr. Fallows the patronage of some gentlemen of fortune and interest, in order that he might be enabled to go to the university. In this purpose he was successful; and in 1809, Mr. Fallows commenced residence as a student of St. John's College, Cambridge.

Whatever difficulties might have previously embarrassed Mr. Fallows' career were now dissipated. At St. John's, honourably distinguished (perhaps above all other colleges) for attention to the education and interests of unfriended merit, he found every assistance which could be desired,—kind friends, most able instructors, and an unlimited power of consulting books. His progress was, accordingly, rapid and successful, though directed, as was to be expected, in the line of the older English geometers, with whom he was already familiar, rather than according to the continental mathematicians. In 1813, he proceeded bachelor of arts, and was third, Sir John Herschel being senior wrangler.

Shortly after taking his degree, as there was no fellowship open at St. John's to which Mr. Fallows was eligible, he removed to Benet College, as mathematical lecturer; but was gladly recalled to his own college in 1815, when a fellowship became vacant. Here he resided for some years; and when his Majesty's Government had resolved upon establishing an Observatory of the highest class at the Cape of Good Hope, Mr. Fallows was selected as the person best qualified to direct the future establishment.

The few months which intervened between the time of his ap-

pointment and his removal to the Cape, were spent by Mr. Fallows in the public and private observatories of this country, in the workshops of our most celebrated artists, in the calculation of special tables, and in devising the best and simplest means of making, registering, and reducing astronomical observations.

On the 1st Jan. 1821, he married Miss Mary Anne Hervey, eldest daughter of the Rev. H. A. Hervey, vicar of Bridekirk, and embarked on the 4th of May following. Mr. Fallows arrived at the Cape on the 12th of August, 1821.

His first undertaking was an approximate catalogue of 275 principal stars, published in the *Phil. Trans.* 1824. From the description of the instruments employed, it will be seen that they were of a very humble description, viz., a portable transit of only twenty inches focal length, and a very indifferent altitude and azimuth instrument by Ramsden, ill-divided, and unstable in its adjustments, being indeed originally constructed as an equatorial. It is probable that the length of time which must necessarily elapse between the design and completion of a first-rate Observatory, in a foreign station, was not fully taken into account, either by the Government or the astronomer; otherwise the temporary instruments would, doubtless, have been of a very different class. The plan of the Observatory was received by Mr. Fallows in the latter part of 1825, and he immediately proceeded to carry it into effect. A site was selected about three miles from Cape Town, and Mr. Fallows lived in a tent on the spot, to determine the lines of the building, and to superintend the workmen. The foundations were dug out before the clerk of the works arrived to relieve him from this task.

In the beginning of 1829, the transit and mural circle were fixed in their places, and we might now have anticipated a season of enjoyment for the Cape astronomer; but, for some cause hitherto unexplained, the circle, to which he had looked forward with pride and exultation, proved for a long time a source of bitter uneasiness. Some part of this must, doubtless, be attributed to the shattered state of the observer's health; but the fact, that "the index "error of two opposite microscopes was ever variable in different "parts of the instrument, while with three microscopes, at 120° dis- "tance from each other, or with the whole six, the index error was "nearly constant," was sufficiently startling to harass a person of less sanguine and zealous temper. Finally, Mr. Fallows was of opinion that some permanent injury had been received by the circle and axis, from a fall which the package received whilst it was removing from the hold of the ship at the time of landing; but that the mean of the six microscopes might be fully depended upon; since high and low stars, when observed directly and by reflexion, gave the same position of the horizontal point. Before he had come to this conclusion, which seems to have been some time in the middle of 1830, sickness deprived him of the services of his assistant, Capt. Ronald; and Mr. Fallows was left, unaided, to do the best he might with a transit and mural

circle. He was relieved from this difficulty by the affection and intelligence of Mrs. Fallows, who offered to undertake the circle observations while he was engaged with the transit. A very little instruction sufficed to render her perfectly competent for this task; and the Cape astronomer had, like Hevelius, the pleasure of finding his best assistant in the partner of his affections. Some of his letters, written at this time, express a strong hope and confidence that he should at length be able to justify the high expectations which had been formed of the Observatory, and that his work would bear a comparison in accuracy, though not in extent, with that of any other establishment.

But the labours of the Observatory were too much for a constitution already much enfeebled by previous illness. He had suffered very severely from a *coup de soleil* soon after his arrival at the Cape, while fixing the small transit; and, besides some less serious complaints, experienced a dangerous attack of scarlet fever in the summer of 1830, from which he seems never to have fully recovered. In the beginning of 1831, his health was visibly impaired, but he could not be induced to leave the Observatory before the equinox. Towards the end of March, he became incapable of struggling any longer with the disease, and went to Simon's Town; but it was now too late, and he breathed his last on the 25th July, 1831, in the forty-third year of his age.

To those who were acquainted with Mr. Fallows, it is unnecessary to dwell upon the integrity and simplicity of his character, or the depth and clearness of his understanding: as an astronomer, he had few rivals. Perfectly acquainted with the practical and scientific departments of astronomy, he carried into the Observatory the same straightforward zeal and honesty which were the distinctive features of his private character; and if his life had been spared, would unquestionably have realised the most sanguine expectations of his friends and admirers.

Mr. Fallows did not leave his observations completely prepared for publication, but so nearly as to require very little additional labour. His wish was to have had them printed under his own eye, after they had been examined and approved of by competent judges in England; for which purpose, examined copies were transmitted by him to the Lords Commissioners of the Admiralty. They consist of about 3000 transit, and several hundred circle observations, with six microscopes, and some series with the invariable pendulum. The instrumental errors are ascertained, and the current reductions computed, so that there will be no difficulty in presenting the results, though not perhaps in the independent manner proposed by the observer. It is to be hoped that these observations and reductions will be speedily published, by the order of the founders and patrons of the Cape Observatory; and we are confident, that they will be found every way worthy of Mr. Fallows and of the country which committed that important and magnificent establishment to his charge.

But though the loss inflicted upon science is thus severe, your

Council are happy to state, that the Government has not at all relaxed its zeal for the Cape Observatory. An assistant, Mr. Meadows, was despatched to aid Mr. Fallows, shortly before his decease: since that time, Mr. Thomas Henderson (a gentleman known to you all, as one of the most active and enlightened cultivators of astronomy in this country, and one to whom this Society has, upon many occasions, thankfully acknowledged its obligations) has been appointed his Majesty's Astronomer at the Cape. That this gentleman, treading in his predecessor's path, and with better health, and under better auspices, may reap the rich harvest which Mr. Fallows could only commence, is the confident wish and hope of those by whom his merit, zeal, and modesty, are appreciated.

Capt. Foster was well known to every scientific man in this country, for his active services in the expedition under Capt. Parry to the North Pole, and for his ardent zeal and great attention to accuracy in every thing which he undertook for the promotion of science. These and other excellent qualities which he possessed, led to his more immediate promotion in the Navy, gained him the reward of the Copley Medal from the Royal Society, and pointed him out as a fit and proper person to conduct a scientific expedition, at that time contemplated by the Government, towards the South; and he was soon after appointed to the command of the *Chanticleer* for that purpose.

The principal object of this expedition was to swing the pendulum near the equator, and also at various places in the southern hemisphere. With this view he was furnished by Government with two of Kater's invariable pendulums, No. 10 and No. 11; and also by this Society with two convertible pendulums of a new construction, one of Iron and the other of Copper, as described in No. 13 of the Monthly Notices, and alluded to in the Eighth Report. Capt. Foster however did not live to bring home the fruits of his own industry and zeal; for he was unfortunately drowned, near the close of his voyage, whilst descending the river *Chagres* in a canoe, towards his ship then lying at anchor.

Capt. Foster has left behind him a vast mass of important information connected with the objects of his voyage. The original copies of his pendulum experiments have been laid before the Council of this Society by the Lords Commissioners of the Admiralty, with a request that they would consider the best mode of obtaining the proper results, with a view to their being made public in the most satisfactory manner. For the attainment of this object Mr. Baily has kindly undertaken to superintend the computations, and to make such further experiments on the pendulums in London, as may be necessary to deduce the required results from the whole series of Capt. Foster's experiments. Already these supplementary experiments are completed; and the computer has also made great progress in reducing the observations from the elements furnished by Mr. Baily for that purpose: and when the whole is finished, a Report will be drawn up on the subject.

Capt. Foster's journal of his experiments is a model of his great

attention to accuracy and minuteness of detail. Every necessary information is regularly entered in *printed blank forms*, with which he had been previously provided (a method which cannot be too strongly recommended in all similar cases); and there is consequently no difficulty or doubt as to the full meaning and effect of every figure that is introduced. The number of places at which Capt. Foster swung the pendulum (including London and Greenwich) is fourteen; and subjoined is a list of these places, in the order in which they were visited, together with the number of series of experiments made at each place, and the pendulums employed at each station. It should here be, however, stated that the iron and copper convertible pendulums were each furnished with *two* knife-edges (respectively marked A and B); so that, in fact, Capt. Foster might be considered as having *six* independent and invariable pendulums, whose results might be compared with each other. The stations that are marked with an asterisk are those which were visited also by Capt. Sabine, in his voyage of experiment in the years 1822 and 1823.

No.	Stations.	No. 10.	No. 11.	Iron.		Copper.	
				A	B	A	B
1	London	8	7				
2	Greenwich	10	10				
3	Monte Video	25	15				
4	Staten Island	46	26	11	12	16	16
5	South Shetland	23	62	15	16	9	10
6	Cape Horn	22	27				
7	Cape of Good Hope	25	17	28	28	23	23
8	St. Helena	21	24			9	12
9	Ascension Island .....*	39	26	10	9	14	13
10	Fernando de Noronah	21	18				
11	Maranham .....*	19	16			16	12
12	Para.....	18	22	12	13	14	14
13	Trinidad .....*	20	17	9	9	12	12
14	Porto Bello.....	21	15				
	Total number of series	318	302	85	87	113	112

The whole number of series therefore was 1017; and as each series consisted (on an average) of 10 coincidences, the total number of coincidences taken by Capt. Foster was upwards of ten thousand: thus forming a mass of observations made in various parts of the globe never before attempted by any individual, and which must have its due weight in all investigations relative to this

important inquiry. In the premature death of this young and accomplished officer, the Society has to deplore the loss of a zealous and active votary to science; and his memory will be long held dear by those who were more intimately acquainted with him in the relations of private life.

M. Jean Louis Pons was for many years employed at the Observatory at Marseilles; where, though his means were extremely limited, he became universally known for his steady attention to the discovery of comets: an attention which procured him the Medal of this Society. In the summer of 1819, Her Majesty Maria Louisa, of Bourbon, entered into a correspondence with Baron de Zach respecting the endowment of a first-rate Observatory at Lucca; desiring him to solicit an astronomer of known eminence to preside. Three names were immediately suggested; Encke, Littrow, and Pons: and as the two former had received appointments in their own countries, the choice fell on the latter. In the mean time the Baron had repaired to Lucca, in order to select the site and direct the erection of the required edifice. It was 100 feet long, by 30 in breadth, independent of dwelling apartments; and was built on a hill in the royal park of La Marlia, four miles from the city, with an excellent command of horizon; and was munificently furnished with instruments of the best description. M. Pons was honoured with the titles of "Her Majesty's Astro-" nomer Royal, Director of the *Astroscopic* department of the " Observatory, and Emerito Professor of the Royal Lyceum." Amongst other arrangements was the payment of 100 dollars, from the queen's purse, for every comet that might be discovered: and it is remarkable that M. Pons, immediately on his arrival, detected the one forming an isosceles triangle with γ and μ *Virginis*. From such a commencement, the astronomical world had great reason to form high expectations; especially as it was decided that the Observations should be published annually, after the manner of those at Greenwich. But, the energy of the institution was spent in its mere erection: it promised much, but performed nothing: and after lingering in existence about four years, it was at length formally abolished. M. Pons, after this disappointment, continued to observe with such means as he could obtain; till Leopold II. invited him to Florence, on conditions as honourable as magnificent. He accordingly went thither in July 1825, after having just recognised Encke's comet at Lucca, before his departure. The previous computation of its return had been a guide to his researches; yet it proved the excellence of his eye at the age of 64, as he saw it long before any one else.

The Abbé Grégoire, afterwards Bishop of Blois, is known to us principally as having taken an active part in the establishment of the Board of Longitude in France, in imitation of the English board, to which was to be confided the publication of the *Connaissance des Tems*. The Abbé, in common with many of his scientific countrymen, was not insensible to the great advantages to be derived, in a maritime point of view, from a well-conducted

Nautical Almanac: and one of the avowed objects for establishing the board in question, was the prospect that the French might be better enabled to compete with this country, with whom they were then at war.

During the past year, the Lords Commissioners of the Admiralty have consulted the Council also on another important subject, connected with the advancement of navigation. In consequence of the alterations about to be introduced into the *New* Nautical Almanac, it has been considered expedient that new *Requisite Tables* should be formed to accompany it: and, with the view of carrying this object into effect, in the most efficient and satisfactory manner, a Committee has been formed to consider, arrange, and propose such Tables as may be thought most proper for that end. This Committee has already met, and a sketch of the proposed Tables has been drawn up, but not yet agreed upon: for, in an affair of so much importance, there cannot be too much time devoted to the consideration of the subject.

It has been a constant source of regret to the Council, as well as to the Members at large, that they have not yet been able to meet with a suite of apartments, where they might consider themselves as permanently fixed. They are fully aware that the interests of the Society are suffering much from this circumstance: but, notwithstanding all their endeavours (and they have been incessant) they have been unable to remedy the defect in a manner agreeably to their wishes. His Royal Highness the Duke of Sussex, having been informed of this circumstance, was pleased to express a desire to exert himself in endeavouring to obtain apartments at Somerset House, contiguous to those of the Royal Society: and, in consequence of this obliging offer, a deputation was appointed to wait on His Royal Highness, to thank him for his kind intentions, and to represent to him the inconveniences of our present situation. His Royal Highness then repeated his best wishes for the success of the Society, and promised to use his endeavours to obtain the apartments in question. The Council, however, have not yet been informed of the result of His Royal Highness's application.

The Standard scale, mentioned in the last Report, is not yet executed. The work has remained a long time stationary, waiting for the micrometer object glasses promised by Mr. Tulley: but which, up to the present time, he has not been able to complete.

Several of the early numbers of the *Monthly Notices* of the proceedings of this Society, having been out of print, and much in request, the Council have made arrangements with the publishers for a reprint of the first fourteen numbers, at a trifling expense: so that those Members whose sets may be deficient in any of such numbers, may now be supplied with new copies to complete them.

No subject having been specifically brought before the Council, as deserving of the Society's medal, on the day appointed by the bye-laws for awarding the same, it has not been adjudged this year.

The Second Part of the Fourth Volume of the Memoirs of the

Society has been some months before the public: and the Members will see, from the numerous articles it contains, the increased activity and interest taken in the science.

Your excellent Treasurer, Dr. Lee, desirous of adding to the importance and interests of the Society, has liberally offered to present the vicarage of Stone in Buckinghamshire to such person as the Council might nominate. They accordingly proposed the Rev. Mr. Fisher, a gentleman well known for his scientific attainments, and for his amiable character in private life. But as it did not suit Mr. Fisher's arrangements to resign the station which he at present fills, the Council next proposed the Rev. Mr. Fletcher, another Member of this Society; who has since been appointed to the vacant living.

His Majesty the King of Denmark, who personally and zealously enters into every subject that may tend to the promotion of science, has recently founded a medal for the discovery of any telescopic comet; subject to the following conditions: viz.

1. The medal is to be given to any person who may first discover a telescopic comet (that is, not visible to the naked eye,) and not of known revolution. If any doubt should arise as to what class it belongs, the decision is to be left to Professor Schumacher.

2. The discoverer must send notice to Professor Schumacher by the first post after the discovery, and fix the time of the discovery as well as he can, in order to enable Professor Schumacher to decide between several discoverers, and fix the absolute time of the first discovery, with regard to the longitude of the place, when the comet shall have been seen by more than one person on the same night.

3. This notice must contain the best possible determination of the position of the comet, and the direction of its course, if this can be ascertained from the observations of one night.

4. If the first night's observations are not sufficient to determine the direction of its course, the discoverer must, as soon as he gets a second observation, communicate it to Professor Schumacher.

5. Professor Schumacher is to decide whether a discovery is to be considered as established or not.

6. The medal is to be adjudged six months after the discovery.

7. All astronomers out of Europe may therefore enter into competition for the medal, if the above-mentioned notice come to the hands of Professor Schumacher within six months after the discovery; but, after that time, no claim can be allowed, nor any medal given.

Amongst the numerous works presented to the Society during the past year, the Council notice with much gratification, the Miscellaneous Works of Dr. Bradley, by the University of Oxford, edited under the able superintendence of Professor Rigaud: containing what has long been considered a desideratum in the history of Astronomy, the original observations made at Kew and at Wanstead, with the zenith sector, and the progress of his celebrated discoveries of aberration and nutation. The principal part of these

valuable documents were discovered by the active and diligent search of Professor Rigaud, amongst the papers of the late Dr. Hornsby, whose family readily gave them up to the University for publication; the rest have been collected from various sources: and the volume altogether reflects great credit on the University of Oxford, and adds new lustre to the character of the distinguished astronomer whose labours it records.

The Council are happy to announce that the plan for making a minute survey of the heavens, and for the formation of some new celestial charts, under the superintendence and direction of the Royal Academy of Sciences at Berlin, appears to have been carried into full effect; and three portions of this useful and valuable undertaking now lie on the table: viz. the 10th hour in $\mathcal{R}$ by Professor Göbel of Coburg, the 14th hour by the Rev. T. J. Hussey of Chislehurst, and the 18th hour (in duplicate) by Padre Giovanni Inghirami of Florence, and M. Capocci of Naples. The respective catalogues contain a list of all the stars (reduced to the year 1800) within 15° of the equator, which are to be found in Bradley, Piazzi, Lalande's *Histoire Céleste*, and Bessel's *Zones:* whilst the charts contain, besides these stars, such other additional ones as may have been seen by the respective observers, down to the 10th magnitude exclusive. This work, when complete, will form the most extensive and accurate general catalogue of the stars that ever was produced: and will be a valuable acquisition to the practical astronomer.

To P. Inghirami the public are also indebted for another recent production, executed on the true principles of science, under the patronage of the Grand Duke Leopold II. This consists of a laborious and detailed survey of Tuscany, deduced from a base of 4488·08 toises, measured with the most rigid precaution between Pisa and Leghorn in the autumn of 1817. Besides giving an excellent series of determined latitudes and longitudes, in the course of leading his chain of triangles from the valley of the Arno to the mountains of the interior, P. Inghirami has entered into an investigation of some delicate corrections, arising from what he terms "lateral refraction;" of which an interesting memoir was communicated to the *Academica Labronica* in 1818. One great advantage attending this valuable work is the prompt and speedy manner in which it has been published; whereby the present generation, which has contributed to its production, will reap the benefit and information contained in this national undertaking: a consideration too often neglected.

The year which has just expired has also been marked by the production of a work now on the table, too remarkable to escape our notice, whether we consider what it contains, or by whom it was written. We allude to the "Mechanism of the Heavens" by Mrs. Somerville. This lady has added to our stock the most complete account of the discoveries of continental mathematicians in physical astronomy which exists in our language. Following closely in the steps of Laplace, but diverging to take notice of the discoveries of

Lagrange, Poisson, and others, she has produced a treatise, which, while it paves the way to a complete understanding of the *Mécanique Céleste*, may be substituted for it by all who do not require, we will not say the most profound, but the most widely-extended knowledge of the heavenly phenomena. Commencing with a general exposition of the laws of mechanics, as in the *Mécanique Céleste*, the authoress proceeds to the proofs of the general theory of gravitation, the elliptic motions of the planets, their perturbations and secular inequalities; generally, though not universally, adopting the methods of Laplace. She then considers the lunar theory, and that of the satellites of Jupiter. At the end of each part the numerical values of the perturbations are deduced; and any particular cause, which might produce a perturbing effect, such as the resistance of a medium, or the attraction of the fixed stars, is inquired into. In a preliminary dissertation a popular account of the results is given, the whole thus forming a complete system of physical astronomy. In concluding this slight notice, your Council cannot forbear their expression of delight and admiration at the achievement of our countrywoman; or of hope, that the example thus set may stimulate others to exertion in a field which, they lament to say, has been too much neglected in England.

The vacancy occasioned by the death of Mr. Fallows, has been supplied, as already noticed, by the appointment of Mr. Henderson: and the Council cannot omit this opportunity of again* bringing before the Society the very able assistance which has been, from time to time, afforded them by the voluntary labours of this gentleman. Bound to the Society by no conventional engagement (for, Mr. Henderson has but very recently become a Fellow of the Society), he was always ready to aid and assist in any investigations that might be required. And although the Council cannot but lament, in common with the Society, the partial separation of so active a member, yet they are well aware that the powerful resources of his mind will be more efficiently called into action, and will reflect more honour on his name and nation in the new sphere in which he is about to engage.

Previous to his departure for the Cape, Mr. Henderson made arrangements for observing Mars at his opposition in November next: and requested Mr. Baily to select the stars proper to be observed with that planet. This has been done; and the Council have directed that the same shall be printed and circulated amongst different observers, in order that the greatest advantage may be taken of the favourable opportunities now afforded for determining the parallax of that planet. Arrangements had been previously made with Mr. Fallows for observing the parallax of the moon; and the stars proper for that purpose are now distinguished by an asterisk in the annual list of the moon-culminating stars: and as, in all probability, a proper selection of stars will be made and pub-

* At the anniversary in 1830, the Society presented Mr. Henderson with a copy of its Memoirs, as a small token of their sense of his services.

lished in future, for the subsequent oppositions of Mars, and the inferior conjunctions of Venus, there is now every reason to hope that, with the co-operation of active astronomers, the parallaxes of these respective bodies will soon be determined with the greatest accuracy.

Besides the Observatory at the Cape of Good Hope, and the Observatories of Paramatta and Madras, we have also, in the southern hemisphere, another at the island of St. Helena, founded by the East India Company, and placed under the superintendence of Mr. Johnson. Captain Lloyd also, who has been lately appointed Surveyor-General to the island of Mauritius, has taken out some excellent instruments to that island; and a $3\frac{1}{2}$-feet transit instrument, by Troughton and Simms, is about to be forwarded to the same place, at the expense of Government, to be placed under the superintendence of M. Dabadie, whose observations on the comet of 1830 were communicated to this Society. And Captain King, R.N., is also shortly about to sail for New South Wales, provided with some astronomical instruments for his own private use. Thus, in the southern hemisphere, where a few years ago we could scarcely reckon a single observer, we have now several active and zealous persons, employed in watching the motions of the heavenly bodies; and in making such observations as may tend to advance the connected sciences of astronomy, navigation, and geography. And here the Council cannot avoid suggesting to those observers, the great advantage that may be taken of their fortunate positions, by their forming arrangements with Mr. Henderson for making such observations, either of moon-culminating stars or such other celestial phenomena to be agreed on, as may tend to fix, on a firm and durable basis, the true longitudes of their respective stations: which will thus become so many zero points on the globe to which the navigator and the geographer may in all cases confidently refer.

Titles of the Papers read before the Society, between February 1831 *and February* 1832.

March 11, 1831. A Letter from Mr. Rumker to Sir J. South, on the appearances of Stars on the Moon's Disc.

A Paper on Irradiation. By Dr. Robinson.

April 8. Extract of a Letter, dated March 24, 1831, from M. Cauchoix, of Paris, to the Rev. R. Sheepshanks, concerning a large Object Glass of 13·29 inches aperture, which had just been finished by M. Cauchoix.

A Paper from Mr. Pond, the Astronomer Royal, containing the results of all the Observations made at Greenwich of the Sun's Zenith Distances, at or near the Solstices, from the time of Bradley to the present.

A Paper from Sir T. Brisbane, containing Observations of the Moon and Moon-culminating Stars, made at Makerstown, in 1829 and 1830.

On the Theory of the Eye-Glasses of Telescopes. By Professor Littrow.

May 18. A Paper by Mr. Baily, on Lacaille's Catalogue of 398 principal Stars.

A Letter from Mr. Dawes, dated April 13, 1831, concerning the triple Star ξ Cancri.

An Index to the Society's Catalogue. By Mr. Stratford.

A Paper containing Micrometrical Measurements of the Angles of Position and Distances of 364 Double Stars. By Sir J. Herschel.

June 10. Observed Occultations of Jupiter and his Satellites by the Moon, on June 1, 1831. By the Astronomer Royal, by Mr. Snow, and by Captain Smyth.

A Letter from Mr. Dawes to Sir J. Herschel, containing Observations of several Double Stars, made during the last and present year.

A Paper by the Rev. Dr. Robinson, on the Dependence of a Clock's Rate on the Height of the Barometer.

Nov. 11. Observed Occultations and Eclipses of Jupiter's Satellites. By Mr. Maclear, made with the Society's Wollaston Telescope, from May 1830 to the present month.

Three observed Occultations in May and June last, and Five observed Eclipses of Jupiter's Satellites, in the months of August, October, and November. By Mr. Snow.

Observation of the Occultation of Aldebaran on the 23d of October. By Mr. Holehouse.

Observations of the Right Ascensions and Polar Distances of the Planets Uranus, Jupiter, Vesta, and Mars, from September to December 1830. By M. Bianchi.

Extract of a Letter, dated October 1831, from M. Cauchoix to Mr. Lubbock, announcing the completion of

another large Object Glass, of the same dimensions as that which Sir J. South is now mounting.

A Catalogue of the Stars observed with the Moon from June to October 1831, at the Greenwich Observatory. From the Astronomer Royal.

A Paper on the Orbits of Binary Stars. By Sir J. Herschel.

Dec. 9. A Paper by Mr. Baily, on the proper motion of the Fixed Stars.

A List of Stars observed with the Moon from the 13th to the 26th November last. From the Astronomer Royal.

Jan. 13, 1832. A List of Occultations, and of Stars observed with the Moon in 1831. By Professor Airy.

Observations of Occultations during the year 1831. By Captain Smyth.

A Letter from Sir J. South to Mr. Baily, on the Occultations of 119 and 120 Tauri, on the 18th December, 1831.

A List of Stars observed with the Moon at the Greenwich Observatory, in December 1831. From the Astronomer Royal.

A List of Public Institutions, and of Persons, who have contributed to the Society's Library, &c., since the last Anniversary.

Royal Society.
Royal Academy of Berlin.
Royal Academy of Brussels.
Cambridge Philosophical Society.
Royal Society of Edinburgh.
Geological Society.
Royal Institution.
L'Académie Royale des Sciences de l'Institut de France.
Le Bureau des Longitudes.
Society of Arts.
Zoological Society.
Athenæum.
Clockmakers' Company.

Professor Airy.
Charles Babbage, Esq.
T. S. Davies, Esq.
A. De Morgan, Esq.
G. Dollond, Esq.
J. E. Drinkwater, Esq.
J. Dryden, Esq.
Professor Encke.
Professor Hamilton.
Professor Hartmann.
Rowland Hill, Esq.
James Holland, Esq.
M. Maurice.
F. Page, Esq.
Professor Quetelet.
Edw. Riddle, Esq.
Professor Rigaud.
Dr. Robinson.
Professor Schumacher.
Mrs. Somerville.
Lieut. Stratford.
Richard Taylor, Esq.
Capt. Woodley.

The Meeting then proceeded to the Election of the Council for the ensuing Year, when the following Fellows were elected, viz.

President: John Brinkley, D.D. *Lord Bishop of Cloyne.*—*Vice-Presidents:* Francis Baily, Esq. F.R.S. L.S. and G.S. and M.R.I.A.; Davies Gilbert, Esq. M.P. V.P.R.S. F.L.S. & G.S.; John William Lubbock, Esq. M.A. V.P. & *Treas.* R.S.; Rev. William Pearson, LL.D. & F.R.S.—*Treasurer:* John Lee, Esq. LL.D.—*Secretaries:* Augustus De Morgan, Esq.; John Wrottesley, Esq. M.A.—*Foreign Secretary:* Captain W. H. Smyth, R.N. F.R.S. & A.S.—*Council:* George Biddell Airy, Esq. M.A. *Plumian Prof. Ast. University of Cambridge;* Charles Babbage, Esq. M.A. F.R.S. *Lucasian Prof. Math. University of Cambridge;* Captain F. Beaufort, R.N. F.R.S.; Lieutenant Thomas Drummond, R. E.; Captain W. F. W. Owen, R.N.; Lieut. Henry Raper, R.N.; Edward Riddle, Esq.; Rev. Richard Sheepshanks, M.A.; Lieutenant William S. Stratford, R.N.; Edward Troughton, Esq. F.R.S. L. & E.

J. Moyes, Castle Street, Leicester Square.

ROYAL ASTRONOMICAL SOCIETY.

Vol. II. *March* 9, 1832. No. 11.

The following communications were read: —

I. A Letter from Mr. Snow to the Secretary, dated Jan. 2, 1832:

"I have the pleasure to say that I observed the late occultations of 119 and 120 *Tauri*, and of *Regulus*.

"119 *Tauri* before its occultation was gradually approaching the moon's dark limb, but it did not disappear until it reached the bright part of the moon, and vanished quite instantaneously upon touching the summit of a long, irregular, lunar mountain, without suffering the smallest alteration in colour or light before its disappearance.

"120 *Tauri* was not quite so certainly observed, as it disappeared just *before* it reached the bright part of the moon, which I was in hopes it would not have done. At the time the occultation of 119 *Tauri* took place, the moon wanted about 5^h of coming to the meridian, and was so nearly full when on the meridian, that both limbs were observed over the wires of the transit-instrument, and gave a semi-diameter agreeing very nearly with that set down in the *Nautical Almanack:* the moon's R.A. thus determined was $5^h\ 31^m\ 3^s,54$. However, when the occultation took place, the quantity that the moon wanted of being full was too small to be estimated by the eye." (Telescope 42 inch refractor; power 120.)

This letter was accompanied by a printed extract from the *Bibliothèque Universelle of July* 1831, containing Baron Zach's observation of the immersions and emersions of *Jupiter's* satellites on June 1, 1831; and also a notice of an astronomical board established in China, which appears to be the same as the well-known *Tribunal of Mathematics.* The number of members at present is seven, of whom three are Europeans.

II. Observations of the comets of 1830 and 1831, by different observers; also, various computations of the elements of the said comets. Collected by Baron Zach, and communicated by Mr. Snow.

These observations, which were made in April and May 1830, and from January to March 1831, consist of right ascensions and declinations, and come from the observatory at Greenwich, Sir James South at Kensington, MM. Gambart at Marseilles, Wartmann at Geneva, Gautier at Chougny, Valz at Nismes, Encke at Berlin, and Rumker at Hamburg. The elements are by MM. Rumker, Valz, and Peters of Copenhagen.

III. Emersion of *Aldebaran* on Feb. 10, 1832, by the Rev. M. Ward. N. latitude 52° 43′ 45″ 18. W. longitude 8^m 46^s,8.

	h	m	s
Instantaneous emersion of Aldebaran	2	57	28,9
Aldebaran transited mid. wire of circle	4	26	13,3
West limb of ☽ ditto ditto	4	28	51,3
Daily gain of the clock.....			1,63

IV. Stars observed with the Moon at Blackheath, from August 1831 to January 1832, by Mr. Wrottesley. The observations were made with a five foot transit.

V. Observations made at the East India Company's Observatory at St. Helena, by Mr. Johnson.

These consist, first, of observations of the moon and moon-culminating stars from January to August 1830; secondly, of observations of the solstices of December 1829, and of June and December 1830. The latitude of the observatory deduced from them is 15° 55′ 23″,65, while from several of the Greenwich stars, observed alternately by direct vision and reflexion, it is 15° 55′ 26″,54.

VI. On the Planetary Theory, by Mr. Lubbock.

The object of this paper is to point out some simplifications which may be obtained in developing the functions R and $r\left(\frac{dR}{dr}\right)$ by the use of the binomial theorem. Mr. Lubbock applies this method to the determination of that part of $r\left(\frac{dR}{dr}\right)$ which contains the first powers only of the eccentricities.

VII. On the Rotation of *Venus*, by the Rev. Mr. Hussey.

Mr. Hussey's object in this paper is to shew that the time of rotation of *Venus* asserted by Bianchini, of 23 days and 8 hours, is a near approximation to the truth, in opposition to Cassini and Schroeter, who fixed the same, the former at 23^h 15^m, the latter at 23^h 21^m; and to Sir W. Herschel, who, though he declares the time of rotation to be doubtful, thinks it cannot be so much as 24 days. The observations of Bianchini are quoted at length, in his own words, by Mr. Hussey, who also enters minutely into the arguments used by the younger Cassini, in support of his father's observations. From a review of the whole argument, Mr. Hussey concludes from Cassini, Maraldi, and Herschel, not having been able with powerful instruments to distinguish the spots of *Venus*, that their latitudes were unfavourable for such observations; that the observations of Schroeter are not to be depended upon, as Sir W. Herschel was unable to verify the same, with a more powerful telescope; that Cassini's observations are in the same predicament, having been made with an inferior instrument, imperfectly mounted and without a micrometer, and not having been much relied on by the observer himself; that we are justified in placing confidence in the observations of Bianchini, from the favourable circumstances under which they were made, the minuteness with which they are

detailed, from their correctness having been ascertained by several bystanders, from the superior nature of the instruments employed, from the measurements being micrometrical, and from the character of the observer. Annexed to this paper were several diagrams of the spots of *Venus*.

VIII. Observations on the Magnitudes of Stars. By Mr. Birt; communicated by Mr. Lubbock.

These observations were made between April 1830 and January 1831. In the notes subjoined to them, the author has pointed out various discrepancies between the magnitudes assigned to the same star by different observers, from all of which, in some cases, his own determination differs. The principal instances are *Pollux*, γ and α *Cassiopeæ*, α, ε, and ζ *Cephei*, $\varkappa$ and ι *Ophiuchi*, β and ε *Aquilæ*, and $\varkappa$ and λ *Lyræ*.

IX. Stars observed with the Moon, at the Royal Observatory, Greenwich, in January and February 1832.

		h	m	s	Daily Rate of Transit Clock.
January 11.	μ Piscium	1	21	4,62	+0″,03
	ν Piscium	1	32	22,70	
	☽ 1 L.	1	57	2,58	
	ξ^2 Ceti	2	18	55,28	
14.	☽ 1 L.	4	54	3,28	+0″,02
	115 Tauri	5	17	4,54	
	119 Tauri	5	22	4,18	
15.	119 Tauri	5	22	4,06	−0″,02
	☽ 1 L.	6	0	0,00	
	ν Geminorum	6	18	41,24	
25.	β Libræ	15	7	38,34	−0″,23
	☽ 2 L.	15	28	45,36	
	β^1 Scorpii	15	55	20,24	
February 9.	(4) Ceti	3	2	48,04	+0″,04
	ξ Tauri	3	18	43,50	
	☽ 1 L.	3	30	12,84	
	48 Tauri	4	6	53,93	
14.	θ Cancri	8	22	41,44	+0″,10
	☽ 1 L.	8	45	54,14	
	π^2 Cancri	9	6	37,38	

X. Occultations and Stars observed with the Moon, at the Observatory, Cambridge, in January and February, 1832.

Day.	Name.	Time of Transit. h	m	s	Clock's losing rate. s
January 11.	μ Piscium	1	21	11,02	1,02
	ν Piscium	1	32	29,40	
	Moon 1 L.	1	57	8,58	
	ξ^2 Ceti	2	19	2,14	
14.	Moon 1 L.	4	54	10,67	1,01
	115 Tauri	5	17	7,68	
	119 Tauri	5	22	7,46	
January 25.	β Libræ	15	7	31,35	0,99
	Moon 2 L.	15	28	37,90	

Day.	Name.	Time of Transit. h m s	Clock's losing rate. s
February 9.	(4) Ceti	3 1 26,61	
	ξ Tauri	3 17 22,25	1,07
	Moon 1 L	3 28 50,93	
	48 Tauri	4 5 32,38	
14.	Moon 1 L	8 44 26,06	
	π^2 Cancri	9 5 10,42	0,80
	(74) Leonis	9 15 27,17	
15.	π^2 Cancri	9 5 9,88	0,60
	(74) Leonis	9 15 26,52	
	Moon 1 L	9 46 34,31	
	Moon 2 L	9 48 55,14	
	α Leonis	9 58 38,09	
23.	φ Ophiuchi	16 20 35,60	0,96
	Moon 2 L	16 48 28,61	
	η Ophiuchi	16 59 48,60	

Jan. 15. Observed the re-appearance of *Jupiter's* 1st satellite, with a $3\frac{3}{4}$ inch Dollond. The telescope was badly mounted, and the satellites were very faint, as the planet was low in haze and the Moon bright. The satellite first seen at $1^h\ 28^m\ 36^s,35$, Cambridge sidereal time, or $5^h\ 51^m\ 28^s,08$ Greenwich mean solar time.

Jan. 20. Observed the disappearance of *Saturn* at the Moon's bright limb, and the re-appearance at the dark limb. From the faintness of the planet, the times of contact could not be observed; and the times of bisection of its centre by the Moon's limb may be inaccurate several seconds. The planet was judged to be bisected on disapp. at $5^h\ 17^m\ 6^s$; on re-app. at $5^h\ 28^m\ 7^s$ Camb. sid. time.

Jan. 25. Disappearance of *γ Libræ* at the Moon's bright limb, at $13^h\ 32^m\ 16^s,82$ Camb. sid. time. Re-appearance at the dark limb, at $14^h\ 50^m\ 22^s,27$. Very good observations.

Feb. 10. Disappearance of *Aldebaran* at the dark limb $1^h\ 58^m\ 46^s,49$ Cambridge sidereal time; very certain observation. Re-appearance at $3^h\ 8^m\ 35^s,23$. This was observed with too low a power; but I believe it is very good.

Among the presents announced this evening was a repeating Theodolite, by T. Jones, of Charing Cross, with horizontal circle of 20 inches diameter, graduated on silver, reading off to seconds by 3 micrometer microscopes, attached to a frame concentric with the circle, and on the same axis; with 30-inch transit telescope, with levels and divided circle, as in the great Theodolite of the trigonometrical survey. This valuable instrument was presented by J. Fuller, Esq. Fellow of the Society.

J. Moyes, Castle Street, Leicester Square.